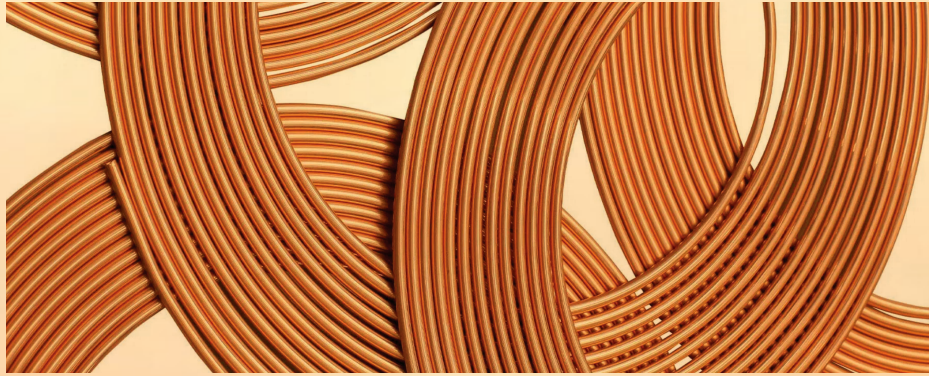




MetTube



beyond ∞ COPPER
Beyond Your Expectations

MANUFACTURES OF PLAIN
AND PANCAK COPPER TUBES
MADE IN MALAYSIA

BEYOND COPPER

Beyond Your Expectations

OUR HERITAGE Beyond leadership

Established in 1991, MetTube is Malaysia's first integrated copper tube project; a joint venture between Metdist group of UK and Mitsubishi Materials Corporation of Japan with an investment of USD 170 million for state of the art plant and machinery.

Metdist is one of the 14 principal ring members at London metal exchange (LME). LME has an approximate trade of 14 trillion dollars annually.

With global footprints in 30 countries and partnering with over 250 OEMs (original equipment manufacturers), MetTube is a leading provider of high performance copper tubes to world markets. The plant based in Malaysia spans over 1.1 million sq. feet with its own heat transfer technology centre and is geared to deliver unmatched customer value.

MetTube has endeavoured to build aculture of continuous improvement to deliver unmatched quality, technology, services to customers and society at large, thus going beyond growing expectations.

The philosophy to reach beyond every aspect of value creation for customer, investor, employees and society we live in, has always been our underlying quest to continually learn and serve.



OUR PHILOSOPHY Beyond value

Copper was the first metal ever known to man as far back as 8700 BC. Known as "Chalkos" to Greeks, "aes Cyprium" to Romans, and identified with Ankh symbol by Egyptians to symbolise "eternal life".

OUR VISION Beyond cost

To deliver innovative products and services that consistently bring about highest value and performances at the lowest cost to customers. To go beyond customer expectations.

To embrace values that reflect an eternal quest for a global vision;

to create a future era of generations that are synonymous to modern, efficient, caring and humane world.

These eternal values of metal are the very values MetTube has embraced in serving customers, investors, employees and societies

at large. These "values" go beyond innovation, quality, technologies and renewable energies to build a green organisation for a sustainable environment.



TECHNOLOGY & INNOVATION

Providing Innovative Technologies for High Performance at Lowest Cost

OUR INNOVATION CULTURE The key to your success

Our heat transfer technology and innovation centre constantly develop newer designs and surfaces, thus not only improving energy efficiency performance (SEER, COP etc) but also reducing the size and cost of the products; some advanced heat transfer tubes have even reduced customer acquisition costs by 90%. We revolutionise new air conditioning product platforms.

MetTube was first in world to innovate super high performance 5 mm OD micro tubes for newer generation of refrigerants and energy saving applications. MetTube's automated advanced bright annealing furnaces help produce "super clean tubes" with oil residue below 0.10 mg/ metre. Supported by our German Tool Room and using our advanced heat transfer technology centre, over 350 surfaces has been tailor made to fit customer products and applications.

MetTube is innovating new processes and products in alloys, aluminium and futuristic materials fulfilling a continuous quest for customer value creation. Delivery and Logistics Management (DLM) – a unique in house developed logistics management tool that has helped large MNCs customers in North America to achieve 100% on time delivery performance for past 25 years.

Copper Management – with support of our parent Metdist, MetTube offers unique copper management customised options that save money and hedge risk for our customers.

Innovation is heart of the Company-wide Quality Commitment (CQC) philosophy that embraces the whole organisation towards structure to deliver higher value at lowest cost. Our cross functional, cross organisational, global teams continuously brainstorm to create value. MetTube's oxygen free air-conditioner copper tubes not only enhances longevity and reliability but it also avoids risk of product corrosion in humid and challenging environments.

TECHNOLOGY IN MOTION



Chemical Composition—Weight %

Element	Copper UNS No.		
	C10200 ^A	C12000	C12200
Copper, ^B min	99.95	99.90	99.9
Phosphorus	...	0.004–0.012	0.015–0.040

Tensile Requirements

Form	Temper Designation		Tensile Strength		Elongation in 2 in. (50.8 mm), min, %
	Standard	Former	ksi ^A	MPa ^B	
Coiled lengths	O60	soft annealed	30 min	205 min	40
Coiled/straight lengths	O62	heavy anneal	30	205	40
Straight lengths	H55	light drawn	36–47	250–325	...
Straight lengths	H58	drawn general purpose	36 min	250 min	...

OUTER DIAMETER	PLAIN TUBE		PANCAKECOILS	
	BOTTOM WALL THICKNESS			
	MINIMUM	MAXIMUM	MINIMUM	MINIMUM
4.00	0.35	0.61	0.46	0.46
4.76	0.35	0.71	0.46	0.81
5.00	0.35	0.81	0.46	1.07
6.00	0.35	0.81		
6.35	0.35	0.91	0.46	1.07
7.00	0.30	0.91	0.46	1.07
7.94	0.30	1.07	0.46	1.07
8.00	0.30	1.07	0.46	1.07
9.52	0.30	1.07	0.46	1.07

OUTER DIAMETER	PLAIN TUBE		PANCAKECOILS	
	BOTTOM WALL THICKNESS			
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
10.00	0.30	1.07	0.46	0.46
12.00	0.35	1.07	0.46	0.81
12.70	0.35	1.07	0.46	1.07
15.88	0.46	1.22	0.52	1.07
16.00	0.46	1.22		
19.05	0.71	1.22	0.71	1.07
22.22	0.71	1.22	0.71	1.07
25.40	0.71	1.22	0.71	1.07

*All value in millimeter

Pancake coils are available in standard lengths of 50 ft (15.24 m) and 100 ft (30.48 m).
For pancake coils we also offer 60 ft (18 m) double layer and 200 ft (60.96 m) four layer coils.

Stright Length Plain Tubes



Size
Outer Diameter 4mm - 25.4mm
Wall Thickness 0.28mm - 1.63mm

Length
5m Max (Annealed)
6m Max (Hard Drawn)

Type K, L & M

Pancake Plain Tubes



Size
Outer Diameter 4mm - 25.4mm
Wall Thickness 0.46mm - 1.07mm
(SWG 10 to 29)

Length
15m, 30.4m
18m, 60.96m

Type K, L & M
ACR : 700 PSI Certified

ACR TUBING

SOFT ANNEALED COILS

General Specification

Application

Used in supermarket, cold rooms, display fridges & air conditioners for the connection, repairs, or alteration of air conditioning of refrigeration units in the field or under construction.

Quality

MetTube tubing is manufactured to consistently meet the demands of the industry and is compatible refrigerants.

Cleanliness

Bore quality meets the 0.038 g/m² ASTM B280 specified limit.

Material

C12200, CU 99.9% min, P 0.015 0.040%

Mechanical Properties

Tensile Strength 205 MPa / min

Elongation min 40%

Soft Annealed

Grain Size 0.035 mm (Min)

Packing

End capped, pancake coil in pallet, pipe in bundles., More details please refer Packing Details.

Length

15m, 30.4m, 18m, 60.96m

Joining

Suitably connected by means of capillary solder fittings.

Bending

Suitable for bending with or without specialized tooling.

METTUBE PANCAKE COPPER COILS - INTERNATIONAL STANDARDS COMPLIANCE FOR PRODUCTS, SAFETY & MANUFACTURING PROCESS

ASTM B280: Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

ASTM B68: Tube is suitable for use in refrigeration, fuel oil, gasoline, or oil lines where the interior surface of the tube is essentially free of any scale or dirt and is specifically specified as ASTM B68.

ASTM B75: Standard Specification for Seamless Copper Tube.

ASTM B251: Covers a group of general requirements for wrought seamless copper and copper alloy tube.

ASTM B88: Specification covers seamless copper water tube suitable for general plumbing, similar applications for the conveyance of fluids, and commonly used with solder, flared, or compression-type fittings.

BS 2781 - 2: Working pressures of metric sized copper tubes according to the BS.

BS EN 12735-1: Procedures and specifications required for manufacturing high-quality seamless round copper tubes.

BS EN 13600: Seamless copper tubes for electrical purposes.

BS EN 1057: Best procedures and specifications required for manufacturing.

BS EN 3781: Specifies the requirements for the safety of persons and property, provides guidance for the protection of the environment, and establishes procedures for the operation, maintenance, and repair of refrigerating systems and the recovery of refrigerants.

BS EN 375: Defines the requirements for the information supplied by the manufacturer of in vitro diagnostic reagents that includes reagent products, calibrators, control materials and kits for professional use.

BS EN 378 : safety of people and property, provides guidance for the protection of the environment, and establishes procedures for the operation, maintenance and repair of refrigerating systems.

BS EN 12449 : Gives the composition, material characteristics and tolerances on dimensions and form for seamless round drawn copper and copper alloy tubes.

BS EN 14324: Description This Standard provides guidance on the application of brazing and the manufacture of brazed joints

BS EN 1254: specifies product characteristics, assessment methods, compliance criteria of the test results and a designation system for fittings with ends for capillary soldering or capillary brazing for connecting with copper tubes

ASA B 9.1 & ASA B35.5: Safety Code For Mechanical Refrigeration

Pressure equipment directive 2014/68/EU Annex I section 4.3: To ensure the free movement of pressure equipment and assemblies within the Community market by harmonising the national safety and health protection requirements to which they are subject.

DIN 1754: Copper tubes - seamless drawn, dimension ranges and coordination of tolerances.

DIN 8905: Tubes for refrigerating systems with hermetic and semi-hermetic compressors.





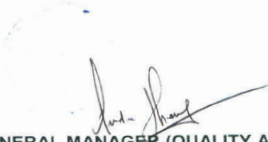
DIN 40500: Copper for electrical purposes - Sheet, strip and technical terms of delivery.

AD 2000 Merkblatt W.0: For pressure vessel design and manufacture.

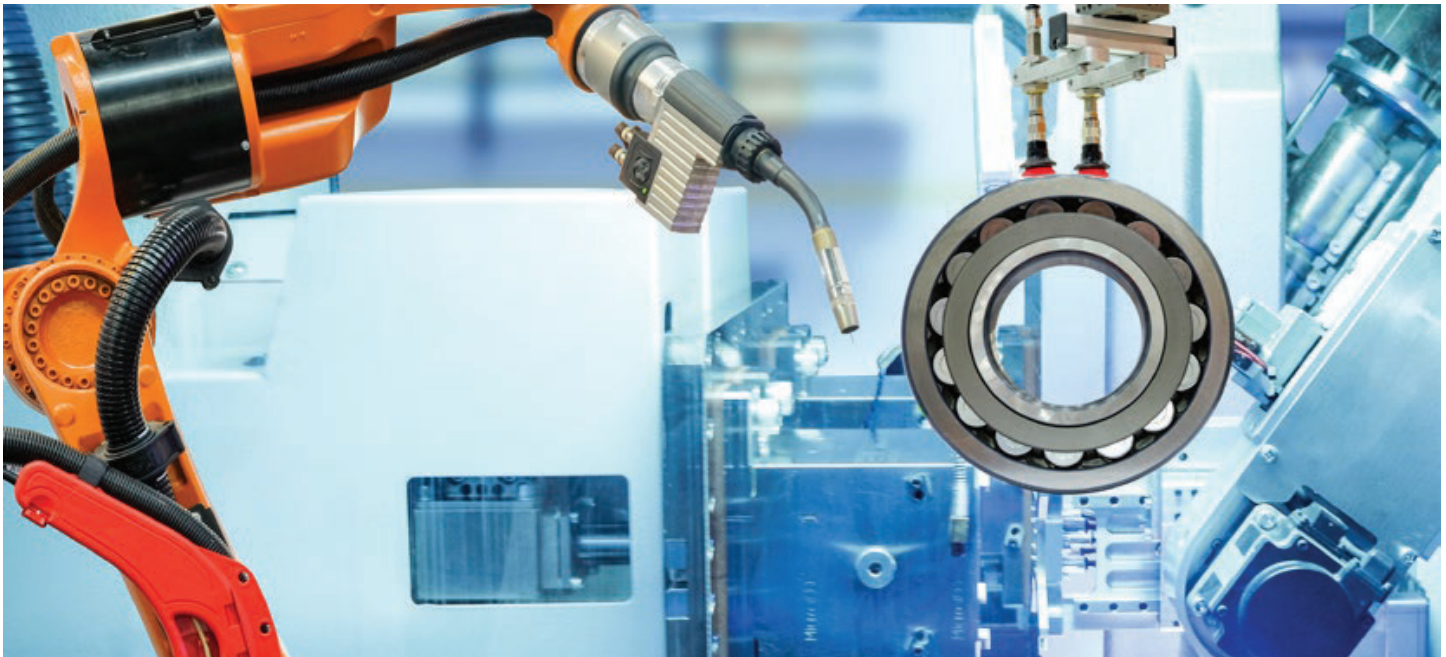
JIS H 3300: Specifies wrought copper and copper alloy seamless pipes and tubes, having a round cross section.



SAMPLE TEST CERTIFICATE

		<h2>Inspection Certificate</h2> <p>3.1 EN 10204 :2004</p>			<p>Mettube Sdn.Bhd. (Company No. 191893-H) No.2,Persiaran Kuala Langat, Seksyen 27,40400 Shah Alam, Selangor Darul Ehsan,Malaysia Tel:+603-5102 3288 Fax:+603-5191 5402</p>				 <p>ISO 9001 : 2008 Certification No. : AR 0683</p>	
Customer: Customer Order No: Nominal Size : OD 12.70mm x 0.750mm WT x 15003mm Specification : ASTM B 280				Report No : Mill Order No : Product Code: BATCH NO: Material Grade : C12200		Date : Quantity : Temper : Soft Annealed				
Coil Number	Tensile Strength N/mm ²	Yield Strength N/mm ² *	Elongation (%)**	Hardness (Scale)	EXPANSION TEST ***	Grain Size (mm)	CHEMICAL COMPOSITION (% Wt)			
							Cu	P		
	205.00 Min	-	40 Min		GOOD	0.035 min	99.90% min	0.015 - 0.040%		
19393162/0	249.2	-	50.8		GOOD	0.035	99.97	0.022		
Dimension and Visual inspection: PASSED Eddy Current Test :1)EC TEST CONDUCTED AS PER APPLICABLE STANDRDS. Remarks : "Intended use as per BS/EN/378"						Certified in accordance to DIRECTIVE 2014/68/EU (PED) and AD-2000 W-6/2 We here by certify that material described herein has been satisfactorily tested and meets your specific requirement				
Expert / Inspection Representative  TUV NORD (M) Sdn Bhd						 GENERAL MANAGER (QUALITY ASSURANCE)				
*At 0.2% Elongation under load , **Gauge length 50mm, *** 40% OD expansion on 60 degree Mandrel										

CUSTOMER COPY F.12.03.00



FACTORY PRESSURE (FATIGUE) TEST RESULTS SAMPLE



To whom so ever it may concern

Subject: Declaration on minimum burst pressure of light annealed tubes.

This is to certify copper tubes made from Copper UNS No. designations C1220-PHOSPOROUS DEOXIDIZED HIGH RESIDUAL PHOSPOROUS, supplied to our customer, produced with reference to ASTM B280 Standards, smooth tube of following sizes, in light annealed temper can withstand up to a minimum burst pressure of specified PSI as given below, at room temperature.

6.35 mm (OD) x 0.65 mm (WT), 6316 PSI

9.52 mm (OD) x 0.75 mm (WT), 4842 PSI

12.7 mm (OD) x 0.75 mm (WT), 3574 PSI

15.88 mm (OD) x 0.85 mm (WT), 3260 PSI

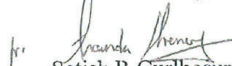
19.05 mm (OD) x 0.85 mm (WT), 2699 PSI

22.22 mm (OD) x 1.05 mm (WT), 2816 PSI

Note: Above mentioned pressures are hydrostatic minimum burst pressures for respective tubes and tested in as supplied light annealed condition. Our tubes are suitable for both R22 and R410A refrigerant. Max working design pressures to be designed by buyers as deemed suitable.

While testing burst pressure, any failure adjacent to HAZ (Heat Affected Zone) In and around brazed/welded joints is not to be considered as tube failure.

Yours Faithfully,


Satish R Gurlhosur
General Manager
Quality & R&D
MetTube Sdn Bhd.

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(Company No: 181893-H)
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40400 Shah Alam,
Selangor Darul Ehsan

METTUBE SDN. BHD.
(COMPANY NO. 181893-H)

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QUALITY & BEYOND STANDARDS

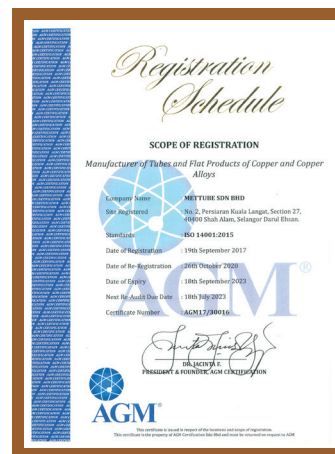
We understand and fulfil the need for peak performance to stay ahead, in an ever evolving and changing market. The Company-wide Quality Commitment (CQC) is our organisation's quality philosophy that encompasses several quality, productivity, efficiency, cycle time reduction, cost reduction, motivation and teamwork. Several internal and external value creating projects with in-house teams, supply chain and customers are developed each year to fulfil our quest towards continuous improvement to stay ahead of competition.

Certified by ISO and TUV for quality, occupational health, safety and environmental management system, MetTube products are aligned with the International Standards for the Environment Management System (ISO 14001:2015) and Occupational Health & Safety Management System (ISO 45001:2018).

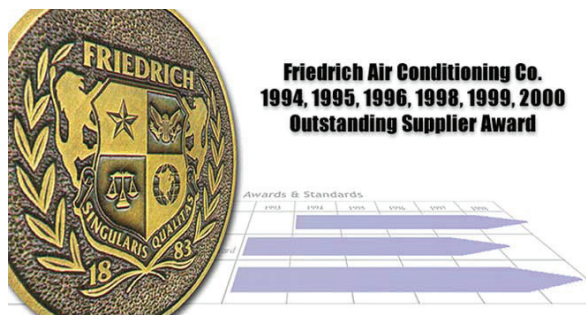
MetTube is one of the few organisations in the global copper fabricating industry that has implemented the lean sigma philosophy; a quality philosophy that evolves from six sigma statistical tool that challenges plants to reduce defects to 3.4 parts per million. This has become the cutting edge management tool kit for world leading quality organisations.



**Malaysian
Environmental
NGOs**



AWARDS



LEAN
6 σ
SIGMA



*OUR QUALITY PROMISE Excellent products every time
The CQC quality initiative has ingrained a culture to excel every day. Innovating continuous improvements to create value and stay ahead of competition by stretching beyond the norms has become our organisation's self-driven culture.*



MetTube

MetTube International Sdn Bhd (513445-T)

(Wholly owned subsidiary of MetTube Sdn Bhd)

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